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Evolution of living donor liver transplantation in adults: a single center experience

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Complications

Introduction

Though living donor liver transplantation (LDLT) for pediatric patients has been widely accepted, its application to adult patients is still controversial because of uncertain safety criteria. A very special situation in Japan is that legal organ procurement system from brain-dead donors has just been instituted and does not provide a constant supply of cadaveric organs for transplantation. For this research, we have sought better solutions for our adult patients within the limits of the LDLT program. This brief report reviews our experience in adult LDLT, with special focus on the impact of graft-size mismatching.

Materials and methods

In the period from November 1994 to May 1999, 79 LDLTs were done in 76 adult patients (20–68 years old, median 40.8). The program was reviewed by the university ethical committee and all patients gave their informed consent prior to inclusion in the treatment. Indications were primary biliary cirrhosis (22%), fulminant hepatic failure (20%), other cirrhosis (19%), biliary atresia (13%), primary sclerosing cholangitis (6%), graft failure (6%), and others, of which 35% needed ICU care preoperatively. Donors were parents (29%), siblings (41%), offspring (14%), and spouses (16%), with ages ranging from 20 to 62 (median 46.0) years old. Six donors were ABO-incompatible. Donor-to-recipient and graft-to-recipient weight ratio (GRWR) ranged, respectively, from 0.61 to 1.84 (1.15) and from 0.45% to 1.83% (0.91).

Based on our previous experience in small-for-size grafts [1] and real-time observation of the results, our strategy for adult LDLT changed and consisted of three historical phases; phase I (up to August 1996, $n = 6$; 33% ICU-bound), grafts were limited to the left lobe with middle hepatic vein (MHV); phase II (up to February 1998, $n = 26$; 15% ICU-bound), introduction of auxiliary transplants to support small-for-size grafts; phase III ($n = 28$), introduction of right lobe grafts without MHV.

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Results

Auxiliary transplants accounted for 42% in phase II and 11% in phase III. Left lobe grafts were considered to be sufficient in 17% even in phase III. Anatomical variants of vascular and biliary pedicles sometimes necessitated multiple anastomoses in each lobe graft; hepatic artery, 5% of left lobes versus 0% of right lobes; portal vein, 0% versus 3%; hepatic vein, 0% versus 28%; hepatic duct, 8% versus 26%. Despite similar donor/recipient weight ratio, median graft weight and GRWR increased from 418 g and 0.77% in phase I and 380 g and 0.73% in phase II to 636 g and 1.10% in phase III. Actual patient survival showed good improvement in elective cases: 50% in phase I, 73% in phase II, and 88% in phase III. In highly urgent ICU-bound cases, however, it remained at around 50% throughout the phases. Among ICU-bound cases, very severe chronic disease showed worse survival than fulminant hepatic failure (53% versus 40%).

The overall impact of graft size on clinical outcome was analyzed in elective cases. Median serum bilirubin at 1 and 2 weeks was 10.7 and 11.1 mg/dl in GRWR < 0.8%, 8.8 and 7.7 mg/dl in GRWR 0.8–1.0%, 2.5 and 2.1 mg/dl in GRWR ≥ 1.0%, and 4.5 and 7.3 mg/dl in auxiliary transplants (GRWR 0.61 ± 0.12%). The incidence of reoperation for surgical complications and of post-transplant bacteremia was, respectively, 50% and 33% in GRWR < 0.8%, 25% and 25% in GRWR 0.8–1.0%, 27% and 7% in

GRWR ≥ 1.0%, and 27% and 9% in auxiliary transplants. Cumulative patient survival was, respectively, 55.6%, 62.5%, 100%, and 81.8%. Such size effects, however, were not observed in highly urgent cases.

Discussion

Through the safe routine application of right lobe grafts, the number of small-for-size grafts has been reduced and their negative impacts on surgical and septic complications have been ameliorated. This has led to a rapid increase in the adult population on our waiting list. However, the problem of size mismatching is still often encountered in limited donor selection. Not only graft size and medical conditions of recipients and donors but also anatomical variants of each hepatic lobe, which can increase surgical risk significantly, should be taken into consideration. It is important that even in phase III, 40% of cases could not obtain grafts of sufficient size (≥ 1.0% body weight). In this situation auxiliary transplants, if limited to elective cases with some remnant function and less metabolic load, might still have a place in treatment modalities.

Apart from the improvement in LDLT techniques, serious deterioration in our urgent cases is a big obstacle in the program. Even fulminant hepatic failure is often referred to us at a very late stage. Increased enlightenment of physicians and society is our continuing mission in Japan.

References

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